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water. In the vicinity of each town one or two small, brackish springs may exist, and these usually at the foot of the bluff, so that the labor of carrying water from the reservoirs, several hundred feet below, to the houses above occupies much time, while the liquid is highly prized and never wasted. I think this scarcity of water originated the custom of performing ablutions in water mixed with saliva and spirted from the mouth over arms and hands, and also that custom which prevails among the women, of using their saliva for mixing clay, both in plastering the walls of the houses and frequently in making potter's clay.

The Moqui people are dwindling away year by year. In the last twenty years they have decreased from six thousand to fifteen hundred, while the Pueblo and Zuñi tribes are just as surely dying out. In a short time they will have entirely disappeared, and their deserted towns will form other groups among the ruins which now dot the desert of the far Southwest.



THE AMERICAN ANTELOPE.

BY S. W. WILLISTON.

THE great plains of the West have afforded to sportsmen and tourists few more attractive features than the American or prong-horned antelope (*Antilocapra Americana*). While their habitat embraces a large range of country, extending from the Missouri River nearly to the Pacific slope, the region that is most peculiarly their home is the vast untimbered prairies of Kansas, Colorado, and Nebraska, where they have so long been associated with the other mammals so characteristic of those arid plains, — the buffalo and prairie-dog.

Since my early childhood their graceful forms and timid, startled movements have been to me familiar sights upon the Kansas prairies, and for several summers they have been daily, almost hourly, objects of my admiration.

Their peculiar habits necessarily prevent their remaining in settled regions. Unlike the deer family that find shelter in forests or rocky ravines, away from the observation of their enemies, the prong-horns seek the most conspicuous localities on the tops of hills and divides, or at the heads of ravines and the smaller water-courses, where their almost wonderful vigilance readily warns them of the approach of danger. The power of sight and the extreme wariness which these animals possess fill

even the experienced observer with fresh surprise, and the inexperienced sportsman with chagrin. The horseman riding over the trackless wilds of Western Kansas or Colorado is constantly observing, far away on the horizon, mere specks of moving life bounding away with more than the fleetness of the greyhound, till in a few moments they are lost to his gaze. Their watchful attention, ever on the alert, will notice the approach of an unusual object even before they themselves are distinguishable from the surrounding prairies. Unlike the buffalo, whose power of sight is comparatively feeble, but which will scent danger from a very great distance, the antelopes depend almost exclusively upon their acute vision for safety. I have frequently watched them, from some sheltered spot near at hand, while they have been quietly grazing: with almost every mouthful of food, cropped from the short, crisp, nutritious buffalo grass that they like so well, the suspicious animals raise their heads erect and gaze about them. This is especially true of the male, he being most frequently the first to apprise a herd of danger; he also possesses more of that curiosity that so often proves fatal. These animals, however, readily become accustomed to even the strangest objects if stationary or permanent. They will often graze quietly within a few hundred yards of a railroad station, nor even show very much fear at passing trains; but their timidity at the approach of human beings is rarely lessened. Their instinct has taught them that man is their worst enemy.

Their long association with the buffalo, of which they have not the slightest fear, renders them indifferent to the presence of domesticated cattle, with which they will mingle freely, feeding quietly side by side. It is in such cases that the hunter can approach them most easily, as they lose much of their habitual watchfulness when in large herds, whether of their own kind, or of buffaloes, or cattle. A friend — a cattle owner on the plains — gives an account of a male which became so attached to a herd of cattle that he seldom left them, and for nearly three months allowed himself to be driven about with his new-found companions, showing his instinctive timidity only at the approach of a strange herder. He finally abandoned the herd when driven to a new pasture ground.

Although so very timid in the feral state, they may be tamed with the utmost facility, evincing an unusual degree of affection for their master, or more especially their mistress. The great delicacy of their flesh as food, together with the hardiness the

animals exhibit in a wild state, renders the question an interesting one, whether the antelope might not be advantageously added to the list of domesticated animals.

When quite young, or for a few weeks or so after birth, the "kids"¹ show a strange lack of fear, and, if approached gently while lying down, will allow themselves to be caught without resisting, and after a few plaintive bleats and a little caressing will often follow their captor, nor permit themselves to be eluded! The young, which are dropped between the 15th or 16th of May and the first week in June, are almost invariably twins. For a short time previous to their birth, the doe, absenting herself from her companions, seeks a somewhat secluded spot near the head of a ravine, where her kids remain for a few days, till they attain sufficient strength of limb to keep pace with the adults. The kids are very playful, and there are few more pleasing sights presented by mammals than the gambols of these beautiful little creatures as they leap about and push each other, occasionally making their sedate mother an unwilling party in their sports. The doe frequently leaves them to graze a mile or two distant, and the kids when tired of playing with each other will find imaginary playfellows in clumps of grass or tall weeds. The friend previously spoken of relates an incident that is worthy of reproduction here. One day, leaving two quite young calves in a secluded spot, and returning in an hour or two, he was amused upon nearing them to find a doe complacently looking on while her young kids, having induced the calves to become their willing playmates, were gayly frolicking with their new acquaintances.

The young very soon attain their full stature, and by the following December are scarcely distinguishable from the adult. It is very rare that a non-pregnant female is shot in the spring, and there is but little doubt that the antelope breeds at the end of the first year. The period of gestation is apparently a little more than eight months.

From early spring till September herds embracing more than a dozen individuals are seldom seen—the males usually keeping more or less isolated. They feed upon the uplands during the day, approaching the water-courses or standing pools only later in the afternoon. At night their favorite resorts are near the heads of ravines or other secluded spots, and they frequently lie in the morning till the sun is some distance above the horizon.

¹ I use the terms, as applied by hunters and sportsmen, of "buck," "doe," and "kid," although evidently incongruous.

The bucks, and, in a less degree, the does also, possess a singular amount of curiosity strangely at variance with their habitual timidity. Any slowly moving or obscure object when seen at a short distance, for the first time, will almost invariably command their instant attention, rendering them undecided and bewildered. Either by moving from side to side in a quick startled manner, or by standing perfectly motionless with head highly erect, at the same time repeating their peculiar shrill snort or whistle, they exhibit a ludicrous mingling of fear and inquisitiveness. So long as the object keeps in sight they continue to approach, often to within a few rods; but the moment they are fully satisfied of danger, or the object disappears, they are off with the fleetness of the wind, not often stopping till one or two miles are between them and the danger. The hunter frequently takes advantage of this trait to allure his game within easy range. A fluttering cloth, the barrel of his rifle, or the hunter's heels, as he lies upon the ground, are often sufficient to attract them. One of my first experiences in hunting these animals has ever since afforded me amusement. Starting a small herd one evening, and not knowing how useless the attempt would be to follow them, I set out in pursuit. On seeing them go over the brow of a neighboring hill, I crept cautiously for several hundred yards till I reached its summit. Then rising to my feet I was myself startled by a shrill snort immediately behind me, and turning about perceived the animals gazing at me in intense astonishment but eight or ten rods away. They must have followed me for nearly a quarter of a mile as I crept along in the early dusk.

When wounded and brought to bay they rarely evince any pugnacity,—in singular contrast with the mule deer (*Cervus macrotis*) of the same regions. I have known a buck when disabled and caught to stand bleating piteously while its throat was cut. Occasionally, however, they will turn and fight with desperation, using both their feet and horns.

In the regions where they abound they decrease slowly by reason of their enemies. They are difficult game even to the professional hunter, and certainly not many fall victims to the wolves. Several times I have watched the attempts of coyotes to prey upon them, but never with success. The wolves crawling through the grass attempt to seize their victims by stealth, for, notwithstanding Mark Twain's very graphic description of the speed of the coyotes, they are hardly a match for the antelopes. The warning snort of a buck quickly brings the herd compactly

together upon some eminence, when the males gathered about watch sharply the movements of their enemy; when closely pressed they take refuge in flight.

There has been much dispute as to whether the male antelope habitually sheds his horns. The weight of evidence is strongly in favor of it; but I should hesitate before positively affirming it myself. At all events the new horns must attain their strength and size *very* soon after the disappearance of the former ones. A female is occasionally shot having a remarkable development of rudimentary horns; in one instance, a doe with kids had horns that measured four inches, with the prongs proportionately developed. Their horns are, however, soft and pliable, with the rudimentary horn-core but little if any developed.

In conclusion, I would call the attention of naturalists to the importance of securing legal protection for this, one of the most interesting of all American mammals, that it may not share the fate that is fast overtaking the buffalo. The antelope can never exist in even a moderately inhabited country. The vast unproductive region of Western Kansas and Eastern Colorado will be its home so long as this region remains comparatively unsettled, provided suitable legislation can be effected in its favor.

ON THE LAWS OF DIGITAL REDUCTION.

BY JOHN A. RYDER.

AT a recent meeting of the Philadelphia Academy I called attention to several facts bearing upon an explanation of digital reduction. It was suggested that the fact of the number of toes being least wherever mechanical strains were greatest and impacts most frequent and most severe might be regarded as an effect of such increased intensity of strains. To make this conclusion appear valid it was only necessary to refer to the foot-structure of the different orders of the class of mammals.

It may be observed that among the primates the only creature having any one toe greatly augmented in size and strength is man; here it is the great one, or the first of anatomists. Its whole structure, especially the articulation with the carpus, calls to mind the condition of things found to exist in the groups which have undergone the most modification in the structure of the feet, namely, the ungulates or hoofed animals, kangaroos, and jumping mice. The calibre of its distal elements is greatly in-